

## SUMMARY OF INVENTION

A lens 118 (also referred to herein as a singlet 118) according to the present invention is illustrated in Figures 1-3. FIG. 4 illustrates an exemplary digital image capture device 400 in which the lens 410 of the invention can be implemented. FIG. 1 illustrates a layout of a singlet 118 in accordance with one embodiment of the present invention, and FIG. 2 and FIG. 3 are respectively, an exemplary a spot diagram of lens and a polychromatic diffraction modulation transfer function that is a measure of the resolution of the singlet 118 of FIG. 1.

According to one embodiment of the invention, the lens 118 includes a first surface 134 for performing color correction functions and a second surface 138 for primarily performing light ray bending functions. The first surface 134 has diffraction efficiency improvement mechanism 144 for improving the resolution of the lens. One manner in which to implement the diffraction efficiency improvement mechanism 144 is to employ a portion of the first surface that has a slightly concave profile. This concave portion increases the diffraction efficiency by reducing the incident angle of the light ray with respect to the surface.

According to another embodiment of the invention, the lens 118 includes a vignetting reducing feature. In this embodiment, the vignetting reducing feature is implemented by setting the distance between the aperture and the first surface of the lens to a predetermined distance. By setting this distance to the predetermined distance, the lens is made to be generally telecentric in nature, which reduces the amount of vignetting in the corners of the image. The telecentric nature of the lens may be achieved by the lens design of the present invention by positioning the aperture with respect to the lens in such a way as to cause the chief ray to be generally perpendicular to the focal plane. By making the singlet telecentric, the lens of the present invention reduces vignetting or shadowing of the corners of the image.

## ISSUE

Whether claims 1-20 are patentable under 35 U.S.C. 103(a) over Kitagawa (US Pat. No. 6,507,443) in view of Kamo (US Pat. No. 6,154,323).

## GROUPING OF CLAIMS

For each ground of rejection which appellant contests herein that applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

## THE ARGUMENT

Issue – Whether Claims 1-20 are patentable under 35 U.S.C. 103(a) over Kitagawa (US Pat. No. 6,507,443) in view of Kamo (US Pat. No. 6,154,323).

The first action, dated Oct. 15, 2003, (hereinafter referred to as “Action”) states that Kitagawa discloses in FIG. 3 the claimed invention, but does not disclose “first surface for performing color correction function, the first surface including a diffraction efficiency improvement mechanism,” as claimed.

Col. 5, lines 19-25 of the Kamo reference is cited on page 3 of the Final Office Action, dated June 3, 2004, (hereinafter “Final Action”) for teaching a surface including a diffraction efficiency improvement mechanism for performing the function of color correction. The Action further states that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the Kitagawa’s lens in light of Kamo’s teaching for the same purpose of color correction as disclosed by Kamo. Regarding claims 5 and 16, the Action states that TABLE 1 of Kitagawa teaches the limitations recited in these claims.

The Action on page 2 proposes a combination of Kitagawa's lens with a diffractive surface from the Kamo reference. This combination is contested as improper for the reasons advanced below. However, even if this combination were proper, which is not conceded, the resulting combination would still fail to teach or suggest the claimed invention. Stated differently, one skilled in the art would not arrive at the invention as claimed by combining the Kitagawa and Kamo references.

Each of the independent claims 1 and 12 recites a first surface or first optical means for performing color correction. Regarding claim 1, the Kitagawa reference, whether alone or in combination with the Kamo reference, fails to teach or suggest "a first surface for primarily performing a color correction function, the first surface including a diffraction efficiency improvement mechanism," as claimed. Regarding claim 12, Kitagawa reference, whether alone or in combination with the Kamo reference fails to teach or suggest "a first optical means for primarily performing a color correction function, the first optical means including a diffraction efficiency improvement means," as claimed.

The Action admits that Kitagawa fails to teach or suggest this limitation. Col. 4, lines 19-25 of Kamo is relied upon for teaching this claimed limitation. However, it is respectfully submitted that col. 4, lines 19-25 of Kamo fails to fairly teach the first surface as claimed for the following reasons. First, it appears that Kamo teaches the use of two or more lens to perform color correction and not a first surface as claimed. For example, Kamo states, "a aspherical surface cannot make correction for chromatic aberrations by itself." (Col. 4, line 20-21) Kamo continues, "For correction of such chromatic aberrations, at least two lens elements must be used in combination." (Col. 4, line 24-25) Second, the cited portion fails to fairly teach or suggest a diffraction efficiency improvement mechanism as claimed.

THE PROPOSED COMBINATION IS BASED ON IMPERMISSIBLE USE OF THE  
CLAIMED INVENTION AS A TEMPLATE TO PIECE TOGETHER THE TEACHINGS  
OF THE KITAGAWA REFERENCE AND THE KAMO REFERENCE

It is respectfully submitted that the Kitagawa and Kamo references are improperly combined. It appears that the Action uses improper hindsight gained from the claimed invention to select certain components from Kitagawa and other components from Kamo to arrive at the claimed invention.

First, it is respectfully submitted that the Kitagawa reference does not explicitly or implicitly teach or suggest any motivation to combine the Kitagawa reference with the Kamo reference or any motivation to modify the Kitagawa single lens design with a selected diffractive surface from the Kamo reference. Furthermore, it is respectfully submitted that the Kamo reference does not explicitly or implicitly teach or suggest any motivation to employ a diffractive surface for the purpose of color correction in a single lens design.

The Action suggests that the single lens of Kitagawa be modified with a diffractive surface from Kamo as noted previously. It is unclear whether such a modification is enabled by the disclosure of the cited references or whether such a modification or combination is even possible since the diffractive surfaces of Kamo are designed to achieve optical results that are different from those optical properties and results desired by single lens design of Kitagawa.

Assuming arguendo that a diffractive surface of Kamo can be incorporated into the single lens design of Kitagawa, the Federal Circuit has stated, “The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780, 1783–84 (Fed. Cir. 1992) [emphasis added].

The Federal Circuit has further held In re Fritch, 972 F.2d 1260, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992):

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. ... “[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art ... would lead that individual to combine the relevant teachings of the references. In re Fine, 837 F.2d 1071, 1074, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988). [emphasis added.]

The Action on page 2 cites, “since Kitagawa and Kamo are both from the same field of endeavor,” as the motivation to combine the teachings of the Kitagawa reference with selected disclosures from the Kamo reference. Specifically, the portion states, “it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify Kitagawa’s lens in light of Kamo’s teaching for the purpose of color correction as disclosed by Kamo.”

Although both references are related to optics as a general matter, it is respectfully submitted that the considerations in designing a single lens for applications with a “strict height requirement” (see Background, pages 2 to 3 of application) are very different from the considerations for designing a “high zoom, low-cost zoom lens system with a first lens group (G1) having a positive refracting power and a second lens group (G2) having a negative refracting power.” (see Abstract, lines 1-6) Moreover, the length of Kamo’s system is 100mm (see, col. 5, line 24-25), which is about five times larger than the thickness of a cellular telephone (e.g., 1.5 to 2 cm (or 15-20mm) thickness) that is an application in which the singlet as claimed may be utilized.

Not only does Kamo employ two groups (G1 and G2) of lens, where each group has multiple lenses, but also, the Kamo system utilizes eleven surfaces (i.e.,  $r_1$ ,  $r_2$ , ..  $r_{11}$ ), where often two of the surfaces are diffractive in nature (Examples 1, 4, 5 and 6). In those cases where Kamo uses a single diffractive surface (Examples 2, 3, 7, 8 and 9), it appears that

none of those diffractive surfaces is in the position of the first surface ( $r_1$ ), which would be the position corresponding to the first surface of the lens as claimed. In this regard, the diffractive surfaces utilized by Kamo are not the same and do not fairly teach the first surface as claimed.

Consequently, it is respectfully suggested that this quoted portion from the Action is deficient and would not have motivated one of ordinary skill in the art to combine the pieces of information in the manner suggested by the Action.

Furthermore, even if the use of a diffractive surface for the purpose of correcting “chromatic aberrations” (Kamo, col. 29, lines 3-19) as set forth in Kamo, this alone is not sufficient to render obvious the claimed invention since the use of a known diffractive surface in a new and non-obvious manner, for example, as applied to a single lens design for applications with a small height restriction, is patentable.

Consequently, it appears that the current patent application has been improperly used as a basis for the motivation to combine or modify the components selected from Kitagawa and Kamo to arrive at the claimed invention. Stated differently, the proposed combination of the cited references appear to be based on hindsight since the cited references do not teach or suggest a motivation to combine the respective elements of each reference in the manner proposed by the Action.

The Federal Circuit has held, “It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated, “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596,

1600 (Fed. Cir. 1988)), In re Fritch, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992). [emphasis added.]

Furthermore, the Federal Circuit has held, “The combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself.” In re Oetiker, 977 F.2d 1443, 24 USPQ 2d 1443, 1446 (Fed. Cir. 1992)

Accordingly, hindsight reconstruction may not be used to pick a component from Kitagawa and another component from Kamo to arrive at the invention as claimed. Accordingly, it is respectfully requested that the rejection of claims 6, 7, 15 and 16 under 35 U.S.C. 103(a) be withdrawn.

In view of the foregoing, it is respectfully submitted that the Kitagawa reference, whether alone or in combination with the Kamo reference, fails to teach or suggest the single lens as claimed. Accordingly, it is respectfully requested that the claim rejections under 35 U.S.C. Section 103(a) be withdrawn.

**EVEN IF PROPERLY COMBINED, THE KITAGAWA REFERENCE AND THE KAMO REFERENCE FAIL TO TEACH OR SUGGEST THE SPECIFIC LIMITATIONS SET FORTH BY THE INDEPENDENT AND DEPENDENT CLAIMS**

It is respectfully submitted that even if the Kitagawa and Kamo references were properly combined, which is not conceded, the Kitagawa and Kamo references fail to teach or suggest specific limitation recited by the claims. It is noted that the dependent claims 2-11 and 13-20 incorporate all the limitations of independent claims 1 and 12, respectively.

Furthermore, the dependent claims also add additional limitations, thereby making the dependent claims a fortiori and independently patentable over the cited references. For example, claims 3 and 14 recite, “wherein the diffractive portion of the first surface reduces the incident angle of at least one light ray with respect to the first surface, thereby increasing the diffractive efficiency of the lens,” which does not appear to be disclosed by the Kitagawa and Kamo references.

Moreover, dependent claims 4 and 15 recite, “wherein the lens has a spot size of less than about 5 microns for a full field of view of about 110 degrees,” which does not appear to be disclosed by the Kitagawa and Kamo references.

Furthermore, dependent claims 6 and 17 recite, “a vignetting reducing mechanism for reducing the shadowing in the corners of an image,” and “means for reducing the shadowing in the corners of an image,” respectively. This limitation does not appear to be taught or suggested by the Kitagawa and Kamo references. For example, neither reference even mentions the design challenge of reducing shadowing, as does the current application. The Background of the current application states, “Another challenge in single lens design is that the image exhibits vignetting (or shadowing) of the corners of the image. Accordingly, it is desirable for the single lens design to have a mechanism that reduces the amount of vignetting (or shadowing) of the corners of the image.” (see lines 12-15 on page 3 of the Background).

Also, dependent claims 7 and 18 recite, “an aperture positioned at a predetermined distance from the first surface of the lens; wherein the predetermined distance is a value that makes the lens telecentric.” This limitation does not appear to be taught or suggested by the Kitagawa and Kamo references.

Moreover, dependent claims 8 and 19 recite, “an aperture positioned at a predetermined distance from the first surface of the lens; wherein the predetermined distance

causes a chief ray to be generally perpendicular to the focal plane.” This limitation does not appear to be taught or suggested by the Kitagawa and Kamo references.

The Action did not address the specific limitations recited by the dependent claims. Instead, the Action only references FIG. 3 of Kitagawa, states “Kamo discloses a surface including a diffraction efficiency improvement mechanism for performing the function of color correction,” and references TABLE I of Kitagawa as teaching the limitations of claims 5 and 16. The Amendment and Response, dated Jan. 15, 2004, respectfully requested that the next Office Action specifically point out those portions of the cited reference that teach or suggest the specific recited elements in the claimed invention. The Final Action, dated June 6, 2004, (hereinafter “Final Action”) cited a specific portion of Kamo relied upon for teaching color correction. However, the specific limitations set forth by the other dependent claims, as described above, remain yet to be addressed. Instead, a blanket statement, “the results as claimed in claims 2-11 and 14-20 are inherently included in the modified lens of Kitagawa in view of Kamo,” is provided.


First, as advanced above, the dependent claims set forth specific limitations that are not merely “results.” Second, from this blanket statement, it is unclear specifically how the references teach or suggest the claimed features. It would be helpful to Applicant and consistent with proper examination practice if the Examiner would kindly indicate the specific structures or portions within the applied references that teach the specific claimed features in the Advisory Action instead of reciting an un-supported blanket statement as an alleged disclosure of the applied references. This comment is not intended to be criticism, but merely a plea for greater specificity so that the applicant may clearly understand what disclosures are being relied upon in the appropriate references to reject dependent claims 2-11, and 13-20.

In view of the foregoing, it is respectfully submitted that the Kitagawa reference, whether alone or in combination with the Kamo reference, fails to teach or suggest the single lens as claimed. Accordingly, it is respectfully requested that the claim rejections under 35 U.S.C. Section 103(a) be withdrawn.

#### CONCLUSION

For the reasons advanced above, Appellant respectfully contends that each claim is patentable. Therefore, reversal of all rejections is courteously solicited.

Respectfully submitted,



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Date: October 27, 2004

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Eric Ho

Oct. 27, 2004  
(Date)